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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,378	11/10/2003	Jackson Hsieh	2011143	4326

7590 05/05/2005

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EXAMINER	
ELLIS, SUEZU Y	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/705,378	HSIEH ET AL.	
	Examiner	Art Unit	
	Suezu Ellis	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☒ Claim(s) *1-3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 November 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the frame layer formed around and *under* the substrate (claim 1, lines 9-10), and the photosensitive chip positioned on the upper surface of the substrate and within the cavity (claim 1, lines 11-12), must be shown or the feature canceled from the claim. No new matter should be entered.

The drawings are objected to because it is unclear in Fig. 2 the difference between the frame layer and the substrate. Appropriate correction is required.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference characters not mentioned in the description: Reference numbers 24 and 26 of Fig. 1 and reference number 60 of Fig. 2.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The abstract of the disclosure is objected to because of minor grammar issues.

In line 6, replace "thicken" with --thickness--.

In line 7, replace "smaller" with --thinner--.

In line 7, replace "a upper surface" with --an upper surface--.

In line 11, between "on" and "upper", insert --the--.

In line 12, remove "are".

In line 13, replace "connecting" with --connect--.

In line 14, between "layer" and "placed", insert --is--.

Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities:

On page 2, lines 3-15, there are minor grammar errors. Correction can be made, as described in the objection to the abstract above. On page 3, line 16, reference numbers for the first and second boards are misnumbered. On page 4, lines 10 and

14, the reference numbers for the frame layer and photosensitive chip are misnumbered. On page 5, lines 7 and 9, the reference numbers for the metal sheets and substrate are misnumbered. On page 5, line 3, replace "thicken" with --thickness-- and "smaller" with --thinner--.

On page 3, lines 13-14, the sentence needs to be reworded, such as "The middle board 51, which is arranged in the center of a zone, is enclosed by the metals sheets 50 and is separate from the metal sheets 50."

Appropriate correction is required.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification fails to support claim 2, where the encapsulated layer is formed via injection molding using a thermoplastic material.

Claim Objections

Claims 1-3 are objected to because of the following informalities:

In claim 1, line 3, replace "including" with --includes--.

In claim 1, line 4, replace "thicken" with --thickness--.

In claim 1, line 5, replace "smaller" with --thinner--.

In claim 1, line 5, replace "a" with --an--.

In claim 1, line 6, between "encapsulated" and "the", insert --by--.

In claim 1, line 6, replace "encapsulate" with --encapsulated--.

In claim 1, line 6, remove "being".

In claim 1, line 6, replace "a" with --an--.

In claim 1, line 11, between "on" and "upper", insert --the--.

In claim 1, line 13, replace "connecting" with --connected to--.

In claim 2, line 2, replace "encapsulate" with --encapsulated--.

In claim 3, line 2, replace "are" with --is--.

In claim 3, line 3, replace "form" with --from--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 1, in line 9, the claim language recites the frame layer formed around and under the substrate to form a cavity. However, the figures indicate the frame layer is only formed near the substrate. For examining purposes, the frame layer will be interpreted to be formed around and near the bottom of the substrate.

With respect to claim 2, claim language recites "thermal plastic material". It is unclear what a thermal plastic material is. Does the applicant intend the material to be thermoplastic? Please clarify. For examining purposes, the materials will be interpreted as being thermoplastic.

Claims 3 and 4 are indefinite due to their dependency.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being obvious over Chuang et al. (US 2003/0213891) in view of Iwasaki et al. (US 5,822,190). Hereafter, Chuang et al. will be referred to as Chuang.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject

matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

With respect to claim 1, Chuang discloses an image sensor comprising a substrate (10) that includes a plurality of metal sheets (78) that are spaced apart and in an alternating manner, where each of the sheets include a first board (80) and a second board (82) positioned at different heights, and a layer that is encapsulated by the metal sheets which forms an upper and lower surface so that the outside ends of the first board and the second board are exposed from the encapsulated layer. Although, Chuang fails to expressly disclose the encapsulated layer, Fig.4 illustrates a layer beneath the top surface of the first board (what appears to be labeled as the substrate), thus equivalent to an encapsulated layer. Chuang further discloses a frame layer (72) formed around and under the substrate to form a cavity with the substrate, a photosensitive chip (13) on top of the substrate within the cavity, a plurality of wires (18) connecting the outside ends of the first boards to the photosensitive chip and a transparent layer placed on the frame layer to cover the photosensitive chip ([0012]). Chuang fails to expressly disclose the thickness of the outer ends of the first board

being thinner than the inner ends of the first board. Chuang and Iwasaki are directed to a similar field of endeavor of photosensitive chip packages. Iwasaki teaches that it is well known in the art to decrease the thickness of part of the metal sheets (col. 5, lines 48-55). It would have been an obvious choice of design to a person of ordinary skill in the art to decrease the thickness of the outside ends of the first board since it is more cost effective – less material will be used thus lower manufacturing cost (col. 4, lines 12-16).

With respect to claim 2, the modified Chuang discloses the frame layer is made of a thermoplastic material via injection molding ([0019], lines 1-4). Chuang fails to expressly disclose the encapsulated layer made of a thermal plastic material via injection molding. However, it would have been an obvious design choice to a person of ordinary skill in the art to make the encapsulate layer via injection molding with a thermoplastic material in order to lower manufacturing cost, since it is well known in the art that injection molding using a thermoplastic material is a cost effective process.

With respect to claim 3, the modified Chuang discloses the substrate further comprises a middle board which is arranged in a zone enclosed by the metal sheets and is apart from the metal sheets, and the photosensitive chip is located on the middle board ([0018], lines 3-5).

With respect to claim 4, the modified Chuang discloses the outside ends of the first board of the metal sheets can be manufactured via pressing ([0019], lines 9-11).

Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being obvious over Lin (US 2002/0079438) in view of Iwasaki (US 5,822,190).

With respect to claim 1, Lin discloses in Fig. 1 and 4 and [0023] and [0025], an image sensor comprising a substrate (100) that includes a plurality of metal sheets (conductive leads – 132) that are spaced apart and arranged in an alternating manner, where each of the metal sheets include a first board (inner lead portions - 132a) and a second board (outer lead portions - 132b) positioned at different heights, an encapsulated layer (main body - 110) encapsulated by the metal sheets to form an upper and a lower surface, so that the outside ends of the first board and the second board are exposed from the encapsulate layer. Lin further discloses a frame layer (110a) formed around the substrate to form a cavity, a photosensitive chip (image sensor chip - 140) positioned on the upper surface of the substrate and within the cavity, a plurality of wires (142) electrically connected to the outside ends of the first boards to the photosensitive chip, and a transparent layer (150) placed on the frame layer to cover the chip. However, Lin fails to expressly disclose the thickness of the outer ends of the first board being thinner than the inner ends of the first board. Lin and Iwasaki are directed to a similar field of endeavor of photosensitive chip packages. Iwasaki teaches that it is well known in the art to decrease the thickness of part of the metal sheets (col. 5, lines 48-55). It would have been an obvious choice of design to a person of ordinary skill in the art to decrease the thickness of the outside ends of the first board since it is more cost effective – less material will be used thus lower manufacturing cost (col. 4, lines 12-16).

With respect to claim 3, the modified Lin discloses in Fig. 4, a middle board (chip-supporting member - 120) arranged in a zone enclosed by the metal sheets and apart from the sheets, where the photosensitive chip (140) is placed on top of the middle board.

Claim 2 is rejected under 35 U.S.C. 103(a) as being obvious over Lin (US 2002/0079438) in view of Iwasaki et al. (US 5,822,190) and further in view of Tamura et al. (US 5,122,861). Hereafter, Tamura et al. will be referred to as Tamura.

With respect to claim 2, the modified Lin addresses all the limitations of claim 1. However, the modified Lin fails to disclose the frame layer and the encapsulated layer are made of a thermal plastic material via injection molding. Lin and Tamura are directed to a similar field of endeavor of image sensors. Tamura discloses an image sensor comprising a frame that is formed via injection molding using a thermoplastic resin (col. 7, lines 58-60). However, Tamura also fails to expressly disclose the encapsulation layer formed via injection molding using a thermoplastic material. Nevertheless, it would have been an obvious design choice to a person of ordinary skill in the art to form the frame layer and the encapsulated layer via injection molding using a thermoplastic material in order to lower manufacturing cost.

Claim 4 is rejected under 35 U.S.C. 103(a) as being obvious over Lin (US 2002/0079438) in view of Iwasaki et al. (US 5,822,190) and further in view of the teachings of Narita (US 6,144,107).

With respect to claim 4, the modified Lin addresses all the limitations of claim 1. However, the modified Lin fails to disclose the outside ends of the first board of the metal sheets are manufactured via pressing. Lin and Narita are directed to a similar field of endeavor of image sensors. Narita teaches it is well known in the art to form metal sheets (lead frames) via pressing (col. 6, lines 17-23). It would have been an obvious design choice to a person of ordinary skill in the art to manufacture the metal sheets via pressing in order to reduce manufacturing costs.

Telephone/Fax Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suezu Ellis whose telephone number is 571-272-2868. The examiner can normally be reached on 8:30am-7pm (Monday-Thursday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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